

State of California
Energy Resources Conservation and Development Commission

In the Matter of:)	Docket No. 08-AFC-2
)	
)	SUPPLEMENTAL SOIL AND WATER
Application for Certification)	CONDITIONS OF CERTIFICATION;
<u>for the Beacon Solar Energy Project</u>)	APPENDIX I; APPENDIX J

Staff submits the following SUPPLEMENTAL SOIL & WATER CONDITIONS OF CERTIFICATION as well as APPENDIX I and APPENDIX J. Changes made to the CONDITIONS OF CERTIFICATION reflect information and comments received from parties at the January 11, 2010 workshop. This public workshop was held to discuss both staff's Final Staff Assessment and the applicant's proposed use of recycled water. The majority of the workshop covered Soil & Water and Biological Resources. Staff anticipates issuing supplemental Conditions of Certification in the areas of Biological Resources and Cultural Resources shortly.

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PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: Groundwater Water Use For Project Construction: The project owner may use up to 8,086 acre feet of onsite groundwater for project construction. Groundwater use and potential impacts will be monitored and mitigated as outlined in items A. and B. below.

Groundwater Use For Project Operation: The project owner may use up to 153 acre feet per year (AFY) of onsite groundwater to meet non-cooling operational needs. The project owner may also use 47 AFY of groundwater for emergency purposes. For the purpose of this condition, the term “emergency” shall mean the inability for BSEP to receive, or for the recycled water supplier to deliver, recycled water to BSEP due to Acts of God, natural disaster or other circumstances beyond the control of the project owner in a quantity sufficient for BSEP to operate at its normal operational level for the season in which the emergency occurred.

The project owner shall use recycled water for all power plant cooling needs. On a temporary basis, groundwater may only be used for cooling purposes while the California City recycled water option, discussed below, is being developed and until it becomes fully implemented. Groundwater use and potential impacts will be monitored and mitigated as outlined in items A. and C. below.

California City Recycled Water Supply – If the California City Recycled Water supply is developed for project operation, then groundwater may be used in accordance with the table presented below:

Operations Water Use – California City Alternative

California City Collection System Construction Year	Maximum Volume of Site Groundwater Extracted for BSEP Operation ¹
1 (end of month 12)	1,353AFY
2 (end of month 24)	1053 AFY
3 (end of month 36)	753 AFY
4 (end of month 48)	453 AFY
5 (end of collection system construction)	153 AFY

¹Includes potable demand

Rosamond Community Services District Recycled Water Supply – If the Rosamond Community Services District Recycled Water Supply is developed for project use groundwater shall be limited to a volume of no more than 153 AFY.

Monitoring and Mitigation for Groundwater Use

The project owner shall also develop and implement a groundwater impact monitoring and mitigation program. The monitoring and mitigation program shall be consistent with the intent of **Soil and Water APPENDIX I**, attached to this FSA. The primary objective for the monitoring is to establish pre-construction and project related water level trends that can be quantitatively compared against observed and simulated trends near the project pumping wells, at the property boundary, and near potentially impacted existing wells. Specifically, the project owner shall do all of the following:

A. Prior to construction,

1. In accordance with the provisions set forth in **Soil and Water Appendix I**, create the Fremont Valley Groundwater Monitoring Committee to monitor project pumping impacts during construction and (if recycled water is incrementally delivered to the site) the “phase-in” period during initial project operation. The purpose of the Fremont Valley Groundwater Monitoring Committee is to provide for land owner protection and include stakeholder participation in evaluation of project impacts. The monitoring committee’s function will be to implement and oversee the project owner’s groundwater monitoring program and to confer with the CPM to verify that there are no unacceptable impacts to groundwater levels, water quality or well performance in water supply wells affected by the proposed pumping during construction of the BSEP and during project operation. The committee will review the applicability of the groundwater monitoring and mitigation program on a recurring 5 year basis following project construction. During their review of the monitoring data, the committee will recommend to the CPM whether the program should be expanded or if some or all of the monitoring should be terminated. In the event that a committee cannot be formed or maintained the CPM will continue to implement and oversee the groundwater monitoring program.
2. Identify and secure access to representative water supply wells predicted by the “Zero Recharge” simulation run (see Groundwater Impacts section of this FSA), to allow monitoring of groundwater levels and quality of those wells. Any new wells within the potentially impacted area not previously identified shall also be included in the monitoring network. Abandoned wells, or wells no longer in use, that are accessible and provide reliable water level data within the monitoring area may also be included as part of the monitoring network.
3. In addition to the Zero Recharge wells discussed above, identify all available wells between the BSEP site and California City, in both the Koehn and California City sub-basins, and include representative wells into the monitoring network. Inclusion of these wells into the monitoring network is necessary to assess potential changes in hydraulic gradients and subsurface flow between sub-basins.

4. At least 30-days prior to project construction, accessible abandoned or unused wells within the monitoring network shall be instrumented with recorders to track groundwater levels during project construction. The water level recorders shall continuously collect and store the data every four hours and shall be serviced at least quarterly.
5. Obtain all historic water level and water quality data for each water supply well within the monitoring network as defined by the groundwater model where access to monitor groundwater conditions can be obtained. Additionally, conduct a well reconnaissance and identify all wells within the monitoring area as defined by the groundwater model. Obtain well construction information (completion depth, well screen depth interval, and pump intake depth), historic well performance data, including pumping and non-pumping water levels, and pump specifications for each of those wells.
6. Update the groundwater database presented in the AFC, and updated in January 2009, with all new information obtained from the wells where access to monitor groundwater conditions has been obtained.
7. Prepare time series graphs for water level and total dissolved solids (TDS) concentrations data for each well within the monitoring network where information is available.
8. Perform statistical trend analysis using Mann-Kendall Trend Test and Sen's Slope Estimator for water levels and the TDS data to statistically analyze the data. Determine the significance of an apparent trend and estimate the magnitude of that trend.
9. At least once prior to construction, collect groundwater levels from the off-site and on-site monitoring network wells and collect and analyze groundwater samples for TDS concentrations to provide baseline groundwater levels and TDS concentrations for both on-site and off-site monitoring network wells. Groundwater samples shall be analyzed for TDS by a California Certified Analytical Laboratory in accordance with Standard Methods 2540C.
10. Map TDS data and groundwater levels within the Koehn and California City Sub-basins from the groundwater data collected prior to construction. Update trend plots and statistical analyses, as data is available.

B. During Construction:

1. Collect static water levels and TDS data from the monitoring network wells on a quarterly basis throughout the construction period, and at the end of the construction period. The continuous monitoring discussed in item A.4, above shall continue a minimum of 30-days after completion of project construction. Perform statistical trend analysis using Mann-Kendall Trend Test and Sen's

Slope Estimator for water levels and the TDS data to statistically analyze the data. Determine the significance of an apparent trend and estimate the magnitude of that trend.

C. During Operation:

1. On a quarterly basis, collect static water level measurements and TDS data from the wells in the groundwater monitoring network to evaluate operational influence from the project. Quarterly operational parameters (i.e., pumping rate) of the water supply wells shall be monitored. Additionally, quarterly groundwater-use in the Koehn sub-basin shall be estimated and the values submitted to the Fremont Valley Basin Groundwater Monitoring Committee for evaluation and consultation with the CPM.
2. On an annual basis, perform statistical trend analyses using Mann-Kendall Trend Test and Sen's Slope Estimator for water levels and the TDS data to statistically analyze the data. The significance of an apparent trend shall be determined and the magnitude of that trend estimated. Based on the results of the statistical trend analyses, the project owner shall determine if the project pumping has induced a drawdown (i.e. reduction in the static water level) in the water supply at a level of ten feet or more below the baseline trend.
3. If water levels have been lowered below pre-site operational trends, and monitoring data provided by the project owner show the water level changes are different from background trends and are solely caused by project pumping, then the project owner shall provide mitigation to the well owner(s). Mitigation shall be provided if the CPM's inspection of the well monitoring data confirms changes to water levels and water level trends relative to measured pre-project water levels, and the well yield has been lowered by project pumping. The type and extent of mitigation shall be determined by the amount of water level decline and site specific well construction and water use characteristics. The mitigation of impacts will be determined as follows:
 - a. If project pumping has lowered water levels and increased pumping lifts by 10 feet or more, increased energy costs shall be calculated in accordance with item **SOIL & WATER-1.C.3.e** below. The compensation and payment schedule for the increased costs shall be provided at the option of the affected well owner as provided in **SOIL & WATER-1.C.3.g**.
 - b. If groundwater monitoring data indicate project pumping has lowered water levels below the top of the well screen, and the well yield is shown to have decreased by 10-percent or more of the average seasonal yield, compensation shall be provided for the diagnosis and maintenance to treat and remove encrustation from the well screen. Reimbursement shall be provided at an amount equal to the customary local cost of performing the necessary diagnosis and maintenance for well screen encrustation. Should well yield reductions be occurring, the project owner shall provide periodic diagnosis of the well screen to assess the rate of encrustation caused by

project pumping and the frequency of required maintenance to maintain well yield to levels above the significance criteria is discussed in SOIL & WATER-1.C.3c. The project owner shall use these findings to provide reimbursement equal to the customary local cost of performing the necessary maintenance at the determined frequency for the life of the project or replace the well. Should the well yield reductions be reoccurring, the project owner shall provide payment or reimbursement for periodic maintenance throughout the life of the project. If with treatment the well yield is incapable of meeting 110% of the well owners maximum daily demand, dry season demand, or annual demand the well owner should be compensated by reimbursement or well replacement as described under condition C.3.C..

- c. If project pumping has lowered water levels to significantly impact well yield below property water supply requirements or cause casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to accommodate these effects. Compensation shall be at an amount equal to the customary local cost of deepening the existing well or constructing a new well. The demand for water, which determines the required well yield, shall be determined on a per well basis using historic seasonal yield data, well owner interviews and field verification of property conditions and historical seasonal water requirements compiled as part of the pre-project well reconnaissance. Well yield shall be considered significantly impacted if it is incapable of meeting 110-percent of the well owner’s maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the well reconnaissance met or exceeded these yield levels.
- d. Electrical cost reimbursement – Through a statistical analysis of the water level data, if the pumping water level falls below a depth of 10 feet from the baseline trend, and is shown to be caused by project pumping, the well owner shall be compensated by the project owner for the additional electrical costs commensurate with the additional lift required to pump. The water level in the well will be assessed relative to the pumping rate established during the pre-site development period.
- e. Where it is determined by the CPM that the project owner shall reimburse a private well owner for increased energy costs, the project owner shall calculate the compensation owed to the owner of any impacted well as described below.

<u>Increased cost for energy</u>	= change in lift/total system head x total energy consumption x costs/unit of energy
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Where:

change in lift (ft)	= calculated change in water level in the well resulting from project pumping
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total system head (ft)	= elevation head + discharge pressure head
elevation head (ft)	= difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.
discharge pressure head (ft)	= pressure at wellhead discharge gauge (psi) X 2.31

- f. The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increased energy costs.
- g. Compensation shall be provided on an annual basis, as described below:

Annual Compensation: Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the project owner shall provide energy meters for each well or well field affected by the project, as described under 3e above. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings or other verification of fuel consumption. For each year after the first year of operation, the project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

- h. Pump lowering – If pumps are exposed but well screens remain submerged, the pumps shall be lowered to maintain production in the well. All costs associated with lowering pumps shall be borne by the project owner. Reimbursement shall be provided at an amount equal to the customary local cost of performing the lowering of the pump.
- i. Deepening of wells – If the groundwater is lowered enough that the well screen is exposed, and lowering of the pump cannot be done to maintain well yield above a level of significance described in SOIL & WATER-1.C.3c, the well shall be deepened or a new well constructed. The well shall be completed in a manner that provides water to the property in consideration of historic seasonal use requirements. All costs associated with deepening existing wells or constructing new wells shall be borne by the project owner. Reimbursement shall be provided at an amount equal to the customary local cost of installing a new well.

- 4. During or after the first five-year operational and monitoring period, the CPM, after consultation with the Fremont Valley Basin Groundwater Monitoring Committee, shall evaluate the data and determine if the monitoring program water level measurements and TDS sampling frequencies should be revised or eliminated. Revision or elimination of any monitoring program elements shall be based on the consistency of the data collected. The determination of whether the monitoring program should be revised or eliminated shall be made by the CPM

after consultation with the Fremont Valley Basin Groundwater Monitoring Committee.

5. At the end of each subsequent five-year monitoring period, the collected data shall be evaluated by the CPM after consultation with the Fremont Valley Basin Groundwater Monitoring Committee and the CPM shall determine if the sampling frequency and TDS sampling should be revised or eliminated.
6. If the applicant elects to utilize the California City option, monitoring of groundwater in the California City area shall be required due to the anticipated reduction in groundwater recharge resulting from collection and elimination of return flows from leachfields. The project owner shall also implement the Tamarisk Removal Program identified in Appendix I.
7. If the Rosamond option is implemented, all off site groundwater monitoring will likely be eliminated within the five year post construction period, in accordance item 1.C.4 above.
8. Comply with Condition of Certification **SOIL & WATER -19**, which requires metering of water used for power plant construction and operation.

Verification: The project owner shall do all of the following:

1. At least 60 days prior to start of construction, the project owner shall submit to the CPM a list identifying the members of the Fremont Valley Basin Groundwater Monitoring Committee and each member's written agreement to participate in accordance with the Committee's stated purpose and function and assist the project owner in implementing the groundwater monitoring program.
2. At least 30 days prior to project construction, the project owner shall submit to the CPM, a comprehensive report presenting all the data and information required in items **SOIL & WATER – 1.A.2** through **-1.A.9**.

The project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations, along with comments to the draft report made by Committee members or well owners within the monitoring network on the data, calculations and assumptions used in development of the report. The project owner shall also provide documentation of communications and negotiation for securing access and inclusion of a well in the monitoring program. Further, documentation shall be provided that shows adequate inquiry of each well owner in the monitoring network, and any subsequent refusal by the well owner to be included in the monitoring network.

3. During project construction, the project owner shall submit to the CPM quarterly reports presenting all the data and information required in items **SOIL & WATER – 1.B.1** through **-1.B.2**.

The project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations, along with comments to the draft

report made by Committee members or local well owners within the monitoring network on the data, calculations, and assumptions used in development of the report.

4. No later than March 31 of each year of construction and 60 days following completion of construction, the project owner shall provide to the CPM for review and approval, documentation showing that any mitigation to private well owners during project construction was satisfied, based on the requirements of the property owner as determined by the CPM.
5. During project operation, the project owner shall submit to the CPM, applicable quarterly and annual reports presenting all the data and information required in items **SOIL & WATER – 1.C.1** through **-1.C.7**.

The project owner shall submit to the CPM all calculations and assumptions made in development of report data and interpretations, along with any agreement or dissenting opinions voiced by Committee members or local well owners on the data, calculations, and assumptions used in development of any reports.

6. After the first five year operational and monitoring period, the project owner shall submit a 5 year monitoring report to the Fremont Valley Basin Groundwater Monitoring Committee and to the CPM that submits all monitoring data collected and provides a summary of the findings. After consultation with the Fremont Valley Basin Groundwater Monitoring Committee, the CPM will determine if the water level measurements and TDS sampling frequencies should be revised or eliminated.
7. The project owner shall provide mitigation as described in **SOIL & WATER-1.C.1**, if the CPM's inspection of the monitoring information confirms changes to water levels and water level trends relative to measured pre-project water levels, and well yield has been lowered by project pumping. The type and extent of mitigation shall be determined by the amount of water level decline and site specific well construction and water use characteristics. The mitigation of impacts will be determined as set forth in **SOIL & WATER-1.C.3**.
8. Eliminated, redundant with #4
9. During the life of the project, the project owner shall provide to the CPM and Fremont Valley Basin Groundwater Monitoring Committee, all monitoring reports, complaints, studies and other relevant data within 30 days of being received by the project owner.

SOIL&WATER-2: The project owner will comply with the requirements of the Kern County Environmental Health Services Department, regarding sanitary waste disposal facilities such as septic systems and leach fields.

Verification: The project owner will submit all necessary information and the appropriate fee to the county of Kern to ensure that the project has complied with the county's sanitary waste disposal facilities requirements. A written assessment prepared by Kern County of the project's compliance with these requirements must be submitted to the CPM for review and approval 30-days prior to the start of power plant operation.

SOIL&WATER-3: The project owner shall comply with the Waste Discharge Requirements for discharge of storm water associated with construction activity that are presented in **Soil and Water Appendices E, F, G and H** and submit the appropriate compliance fee to the LRWQCB. The project owner shall develop, obtain compliance project manager (CPM) approval of, and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the BSEP site, laydown area, and all linear facilities.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the CPM and LRWQCB, a copy of the construction SWPPP for review and CPM approval prior to site mobilization. The project owner shall also submit to the CPM evidence of payment to LRWQCB of the appropriate compliance fee. The project owner shall retain a copy of the SWPPP on site. The project owner shall submit to the CPM copies of all correspondence between the project owner and the LRWQCB regarding the Waste Discharge Requirements for the discharge of storm water associated with construction activity within 10 days of its receipt or submittal.

SOIL&WATER-4: The project owner shall comply with the requirements of the Waste Discharge Requirements in **Soil and Water Appendices E, F, G and H**, for discharges of process water and storm water associated with industrial activity. The project owner shall develop, obtain CPM approval of, and implement an industrial SWPPP for the operation of the project.

Verification: At least 60 days prior to commercial operation, the project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the project for review and approval prior to commercial operation. The project owner shall retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the LRWQCB regarding the Requirements of Waste Discharge of process water and storm water associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the SWRCB.

SOIL&WATER-5: Prior to site mobilization, the project owner shall obtain CPM approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in risk to off-site properties from

flooding, and identify all storm water monitoring and maintenance activities. The project owner shall complete all necessary engineering plans, reports, and documents necessary for Kern County to conduct a review of the proposed project and provide its written evaluation as to whether the proposed grading, drainage improvements, diversion channel design, and flood management activities comply with all county requirements. The project owner shall ensure compliance with all county standards and requirements for grading, erosion control, and flooding for the life of the project. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and with requirements described in Condition of Certification **BIO-18**. The DESCP shall contain the following elements:

- ***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas, such as Waters of the State.
- ***Site Delineation*** – The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale
- ***Drainage*** – The DESCP shall include the following elements suitable for submittal to FEMA as part of compliance with Condition of Certification SOIL&WATER-6:
 - a. Topography – Topography for offsite areas are required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing Pine Tree Creek flood hazard. Spot elevations shall be required where relatively flat conditions exist.
 - b. Proposed Grade – Proposed grade contours shall be shown at a scale appropriate for delineation of onsite sub-basins, drainage ditches, pond contours, diversion channel, and tie-ins to the existing topography.
 - c. Hydrology - Existing and proposed hydrologic calculations for on-site areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.
 - d. Hydraulics - Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, retention facilities and best management practices (BMPs). Design calculations and the results of the hydraulic backwater model for the Pine Tree Creek diversion channel shall be included.
 - e. Channel Stabilization Plan – The Project Owner shall present methods to mitigate for adverse hydraulic conditions (high velocities, high shear stress, Froude Numbers greater than 0.8) in the proposed diversion channel.

- **Watercourses and Critical Areas** – The DESCPC shall show the location of all nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas:
 - a. FEMA Regulated Special Flood Hazard Areas (Effective floodplain from DFIRM) shall be shown on site as well as upstream and downstream within 2,000 feet from the BSEP property boundary;
 - b. Existing Conditions 100-year Floodplain – Shall be continuous with the effective floodplain; and
 - c. Proposed (Revised) Conditions 100-year Floodplain – Shall be continuous with the effective floodplain.
- **Clearing and Grading** – The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Proposed contours shall tie into existing topography. The DESCPC shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.
- **Project Schedule** – The DESCPC shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element and diversion channel excavation, and construction, and final grading/stabilization). The project schedule shall identify the construction sequence for the Pine Tree Creek diversion channel. Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- **Best Management Practices** – The DESCPC shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs, including application of soil stabilizers, applied to disturbed areas following construction.
- **Erosion Control Drawings** – The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer (PE) or a Certified Professional in Erosion and Sediment Control (CPESC).

- **Agency Comments** – The DESCP shall include copies of recommendations, conditions, and provisions from Kern County, CDFG, and LRWQCB.
- **Monitoring Plan** – Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, storm water retention basins, and the diversion channel.

Additional monitoring requirements shall be presented in a Desert Wash Mitigation and Monitoring Plan as discussed in Condition of Certification **BIO-18**.

- **Maintenance Plan** – The maintenance plan shall identify activities and procedures needed to maintain capacity within all onsite drainage ditches, and the drainage ditch that currently diverts flow along the western property boundary. Channel maintenance may include BMP repairs, bank stabilization, debris removal, grade control, and revegetation. The maintenance plan shall support the objectives of the revegetation plan and mitigation effort. Maintenance activities must also include removal of accumulated sediment from all retention basins when an average depth of 0.5 feet of sediment has accumulated in the retention basin. The maintenance plan shall be developed in accordance with the activities and procedures identified for the Pine Tree Creek diversion channel as part of compliance with Condition of Certification **SOIL&WATER-7** and **SOIL&WATER-8**.

Verification: The project owner shall do all of the following:

1. No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Kern County **and the LRWQCB for review and comment. A copy shall be submitted to the CPM no** later than 60 days prior to the start of site mobilization for review and approval. The CPM shall consider comments received from both Kern County and LRWQCB.
2. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.
3. Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities.
4. Provide the CPM with two (2) copies of all monitoring or other reports required for compliance with Kern County, CDFG, and LRWQCB.
5. Provide Kern County, LRWQCB and the CPM with quarterly maintenance activity reports for all onsite drainage ditches and the drainage ditch that currently diverts flow along the western property boundary. These reports shall also provide an account of any significant runoff event and will describe channel performance.

SOIL&WATER-6: In accordance with Kern County's Floodplain Management Ordinance and 44 CFR 65.12, the project owner shall prepare all necessary engineering plans and documents to support a Conditional Letter of Map Revision (CLOMR) application submittal to FEMA. The project shall not commence construction in the SFHA until Kern County receives from FEMA an approved CLOMR. Following construction, the Project Owner shall prepare all necessary documents required for a final Letter of Map Revision (LOMR). The project owner shall use FEMA's Guidelines and Specifications for Mapping Partners for guidance. The project owner shall:

- a. Prepare hydrologic analyses to estimate the 10-, 2-, 1-, and 0.2-percent annual chance flood events for the Pine Tree Creek watershed. The analyses shall be conducted using numerical models approved by FEMA;
- b. Prepare design drawings in accordance with FEMA CLOMR standards for the channel, include typical channel cross section dimensions, typical details for all structural elements needed to protect the channel from erosion, and a grading plan for proposed conditions that ties into existing topography;
- c. Conduct hydraulic analyses for existing and proposed conditions. Plot the water surface and energy grade line profile for the constructed channel. Tie the proposed conditions water surface elevation profile into the water surface profile from the existing hydraulic model upstream and downstream of the site;
- d. Prepare flood hazard mapping for the existing and proposed conditions. Floodplain mapping shall tie-into the upstream and downstream special flood hazard mapping shown on the effective DFIRM;
- e. Provide required sediment transport study and bulking factor information per FEMA standards;
- f. Provide notification to all adjacent property owners, impacted by the proposed change to the SFHA;
- g. Complete the necessary FEMA MT-2 application forms package and pay all applicable CLOMR review fees. The submittal shall be certified by a California-licensed professional engineer; and
- h. Address all FEMA review comments as needed to receive an approved CLOMR. Prior to mobilization, the Project Owner shall receive confirmation from Kern County that FEMA has issued a CLOMR for the BSEP. The Project Owner shall address all "conditions" in the CLOMR during project construction. No later than six months after the end of construction, the project owner, through a request from Kern County, must notify FEMA of the changes in accordance with 44 CFR 65.3. The Project Owner shall submit the following technical or scientific data as part of a Letter of Map Revision (LOMR) request:
 - i. Conduct an As-Built survey of the completed construction;

- j. Update the Proposed Conditions Model to reflect the As-Built Revised Conditions and delineate the resulting flood hazards;
- k. Complete the necessary FEMA MT-2 application forms package and pay all applicable LOMR review fees. The submittal shall be certified by a California-licensed professional engineer;
- l. Address all FEMA review comments as needed to receive approval of the LOMR; and
- m. Notify the CPM of the approved LOMR.

Verification: The project owner shall do all of the following:

1. Submit a copy of the application for a CLOMR to the CPM concurrently with the submission to FEMA.
2. No later than thirty (30) days after receiving notification from FEMA that all required CLOMR or LOMR documents have been received by FEMA, the Project Owner shall notify the CPM that the project is currently being reviewed by FEMA. During the review process, the project owner shall submit all correspondence between FEMA and project owner's engineer representative responsible for addressing FEMA's comments.
3. Prior to construction activity within the effective SFHA the Project Owner shall provide a copy of the CLOMR to the CPM for verification.
4. Following construction of the channel improvements, the Project Owner shall complete an As-built survey of the improvements, update the hydraulic model, and prepare a final submittal, to include forms and fees, for a FEMA LOMR request. The Project Owner shall submit a copy of the completed LOMR submittal to the CPM and Kern County for review.
5. No later than thirty (30) days after receiving notification from FEMA that the LOMR has been issued to Kern County the project owner shall submit a copy of the LOMR to the CPM as verification.

SOIL&WATER-7: The property owner shall coordinate with a public entity to establish a BSEP Reclamation District. The property owner shall be responsible for maintaining the integrity, engineering design, and design discharge capacity of the rerouted Pine Tree Creek channel. The reclamation district shall be formed with consideration of all appropriate Waste Discharge requirements presented in **Soil and Water Appendices E through H**. The project owner shall also ensure that the BSEP Reclamation District manages utility crossings of the rerouted Pine Tree Creek channel. The property owner shall develop the Reclamation District according to the stream alteration agreement as described in the Biological Resources section and in accordance with Condition of Certification **BIO-18**.

Funding for the reclamation district shall be provided by the property owner in perpetuity. The property owner shall ensure the following duties are performed:

1. In coordination with the public entity, develop and supervise the implementation of a Channel Maintenance Program in accordance with conditions of certification;
2. Consult with the Reclamation District Manager on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP);
3. Be available to coordinate with the Designated Biologist on mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat, as they relate to maintenance district responsibilities;
4. Notify the CPM of any non-compliance with conditions of certification related to the reclamation district;
5. Respond directly to inquiries of the CPM regarding the reclamation district or the Channel Maintenance Program;
6. Maintain written records of the tasks specified above and those included in the Channel Maintenance Program. Summaries of these records shall be provided to the CPM, as required, per the conditions of certification;
7. Train the Reclamation District personnel as appropriate, and ensure their familiarity with the Channel Maintenance Program;
8. Manage utility crossings at the Diversion Channel;
9. Develop the Reclamation District's CIP Plan and manage the available funds;
10. Be available to coordinate with the public entity during emergency repairs conducted by the Reclamation District;
11. Report to the CPM and the public entity annually the Reclamation District's available funds and annual costs each year since the District was created.
12. Prior to receiving a FEMA approved CLOMR, required as a part of Condition of Certification **SOIL & WATER -6**, the property owner shall receive written consent from a public entity allowing BSEP to create a special reclamation district. The property owner shall provide a copy of the final Maintenance Agreement to the CPM for approval and shall include a detailed discussion of the funding mechanism for the Channel Maintenance Program and Capital Improvement Projects. The maintenance agreement shall report the name and contact information of the Reclamation District supervisor.

SOIL&WATER-8: Following creation of the Reclamation District, the project owner shall coordinate with the public entity and the Reclamation District supervisor to develop and implement a Channel Maintenance Program that provides long-term guidance to the Reclamation District to implement routine channel maintenance projects and comply with conditions of certification in a feasible and

environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document prepared by the project owner, reviewed by the CPM and the public entity, and adopted by the Reclamation District.

The project owner is responsible for implementing a Channel Maintenance Program as presented in **Soil and Water APPENDIX J**, attached to this FSA. The Channel Maintenance Program shall be developed in consultation with the Reclamation District and the public entity and shall include the following:

1. **Purpose and Objectives** – establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, facilitation of applicable biological mitigation measures and maintain groundwater recharge.
2. **Application and Use** - The channel maintenance work area is defined as the BSEP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that BSEP or the District owns or holds an easement for access and maintenance. The Program would include Pine Tree Creek maintenance as needed to protect the BSEP facilities.
3. **Channel Maintenance Activities**
 - a. **Sediment Removal** - sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.
 - b. **Vegetation Management** - manage vegetation in and adjacent to the diversion channel to control invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-18**.
 - c. **Bank Protection and Grade Control Repairs** - bank protection and grade control structure repairs involve any action by the District to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The District would implement instream repairs when the problem (1) causes or could cause significant damage to BSEP, adjacent property, or the structural elements of the diversion channel, (2) is a public safety concern, (3) negatively affects groundwater recharge, or (4) negatively affects the mitigation vegetation, habitat, or species of concern.
 - d. **Routine Channel Maintenance** - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at BSEP storm drain outfalls.
 - e. **Channel Maintenance Program** – exclusions including: emergency repair and CIP.
4. **Related Programmatic Documentation** – CPM will review and approve the Channel Maintenance Program programmatic documentation. Maintenance activities shall comply with the stream alteration agreement provisions and

requirements for channel maintenance activities consistent with California's endangered species protection regulations and with NFIP regulations.

5. Channel Maintenance Process Overview

- a. **Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the conditions of certification for individual routine maintenance of the engineered channel without having to perform separate CEQA review or obtain permits.
- b. **Maintenance Guidelines** - based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.
- c. **Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. BSEP's vegetation management activities are established in Condition of Certification **BIO-18**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection. The final determination on allowable sediment accumulation will be studied by the applicant as part of compliance with Condition of Certification **SOIL&WATER-7**.
- d. **Reporting** – CPM requires the following reports to be submitted each year as part of the ACR:
 - i. Channel Maintenance Work Plan - Describes the planned "major" maintenance activities and extent of work to be accomplished; and
 - ii. Channel Maintenance Program Annual Report - Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).
 - iii. A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.

6. **Resource Protection Policies** - establishes policies to ensure that resources would be protected to the fullest extent feasible during routine channel maintenance activities. Policies would be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.

Verification: Following creation of the Reclamation District and at least 60 days prior to the start of any project-related site disturbance activities, the property owner shall coordinate with public entity and the Reclamation District supervisor to develop the Channel Maintenance Program. The property owner shall submit two copies of the programmatic documentation, describing the proposed Channel Maintenance Program, to the CPM (for review and approval). The property owner shall provide written

notification from the Reclamation District that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The project owner shall:

1. In coordination with the public entity and the Reclamation District staff, develop and supervise the implementation of a Channel Maintenance Program in accordance with conditions of certification;
2. Ensure the BSEP Construction and Operation Managers receive training on the Channel Maintenance Program and coordinate with the Reclamation District staff;
3. Coordinate with the Reclamation District staff to develop Maintenance Guidelines; and
4. As part of the BSEP Annual Compliance Report to the CPM, submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

SOIL&WATER-9: The project owner shall submit two (2) copies of the 60-percent and 90-percent design drawings for the diversion channel to Kern county and the CPM for review and comment. The project owner shall prepare a set of design specifications to supplement the 90-percent design drawings. Plans, specifications, computations and other data shall be prepared by persons properly authorized by the State of California. If the 60-percent plans or 90-percent plans and specifications do not comply with the appropriate Conditions of Certification, the necessary changes or revisions to the plans shall be made by the project owner. If the CPM finds that the work described in the plans and specifications conform to the Conditions of Certifications in the Energy Commission Decision and other pertinent LORS, then the project owner shall submit two (2) copies of the 100-percent set for CPM approval. All design drawings must be submitted on bound or stapled 24" x 36" size paper.

Verification: The project owner shall submit two (2) copies of the 60-percent and 90-percent (with specifications) design drawings to the CPM for review and comment. The design drawings shall be submitted as required in the verification for Condition of Certification **SOIL&WATER-6**. No later than 30 days after publication of the Energy Commission Decision, the 60-percent set of design drawings shall be submitted to the CPM for review and comment in consultation with CDFG and Kern County. The project owner shall submit the 90-percent design drawings to the CPM after the person who originally drew the plan or their duly authorized agent addresses the CPM's 60-percent submittal comments and required changes directed by FEMA during the CLOMR review. The 100-percent design drawings and specifications (construction documents), shall be signed and sealed by a Registered Professional Engineer in the State of California, are to be submitted as the final, approved set of construction documents prior to site mobilization.

SOIL&WATER-10: The project owner shall comply with the Kern County Division Four Standards for Drainage to estimate an appropriate imperviousness value to apply to onsite storm water runoff and retention basin analyses. Retention basin sizing shall take into account the effects of dust suppressants on infiltration. The applicant shall assess all offsite drainage areas tributary to the site in the hydrologic study. Runoff from tributaries mapped as a water of the state shall not be piped.

Verification: The project owner shall do the following:

1. Estimate an appropriate imperviousness for the BSEP developed conditions site. Include a description of the methods used to calculate imperviousness in the DESC.
2. Prepare a hydrologic study to estimate the peak flood flows to the BSEP site for two offsite watersheds that drain toward the BSEP: A) the 8.0 square-mile drainage area east of the Barren Ridge watershed and B) the 1.5 square-mile area draining the Chuckwalla Mountains. Submit the hydrologic analysis results to the CPM as part of the DESC, required as part of Condition of Certification SOIL&WATER-5.
3. Provide the open channel design across the solar field for undetained runoff originating from the offsite tributary west of BSEP. Provide the CPM with evidence that a maintenance easement is established for the channel.

Soil & Water 11 deleted See SOIL&WATER 6 part E

SOIL&WATER-12: The project owner shall comply with the Kern County Standards for Drainage, Chapter IV and provide engineering analyses and design details for the transition where the diversion channel intercepts the natural channel. The project owner shall provide engineering analyses showing that the shallow flooding along uncertain paths from the south will not cause diversion channel bank failure from lateral overtopping. The project owner shall submit a proposed-conditions grading plan as evidence to show the diversion channel will capture shallow flooding along the left bank (looking downstream) of the natural wash.

Verification: The project owner shall complete the engineering analyses, design, and grading for the transition from the natural channel to the proposed diversion channel to intercept the design discharge along the southern property boundary. The engineered design for this transition shall be provided to the CPM for review and approval at the same time the 30 percent design drawings are submitted to the CPM as required in Condition of Certification **SOIL&WATER-6**. The project owner shall also provide final design details for the transition in the 60 percent and 90 percent design drawings to the CPM for approval as required in Condition of Certification **SOIL&WATER-9**.

SOIL&WATER-13: The project owner shall complete the hydraulic analyses and final basis of design for the diversion channel, upstream- and downstream-transitions, bank protection, levees (if applicable), and grade control structures using hydraulic criteria for flood velocity, depth, Froude Number, and shear stress appropriate for the anticipated channel stability thresholds. These thresholds are based on the Kern County Division Four Standards for Drainage, Chapter X, where applicable. The value of the Froude Number between grade control structures shall be less than 0.8. Channel design elements not in compliance with Kern County Division Four standards will require a written variance from the County. All grade control structure stilling basins shall be designed with weep drains to prevent perched groundwater conditions and promote groundwater recharge. The project owner shall also be responsible for a geotechnical investigation to test the soils as necessary for final design of the grade control structures and bank stabilization measures if required by FEMA or Kern County Standards. The results of the hydraulic analyses and applicable geotechnical investigations, if any, shall be presented in the basis of design report submitted with the FEMA application (Condition of Certification **SOIL&WATER-6**).

Verification: The results of the hydraulic analysis and applicable geotechnical investigations, if any, shall be presented in the basis of design report submitted with the CLOMR application. All design variances approved by Kern County shall be provided to the CPM.

SOIL&WATER-14: The project owner shall design the diversion channel to avoid soil cement lining on the bed of the channel between grade control structures to address resource agency comments. The project owner shall install bank toe protection along the entire length of the diversion channel to protect the banks from under-cutting, channel migration, and local erosion.

Verification: The project owner shall provide channel design drawings to the CPM for review and approval. The channel design drawings shall show the cross section detail for the bank toe protection measures, the longitudinal extent of the bank treatment with linear dimensions, and the area of the exposed diversion channel bed between each grade control structure. The design drawings shall be submitted as part of the design submittals identified in Condition of Certification **SOIL&WATER-9**.

SOIL&WATER-15: The project owner shall prepare a final sediment transport analysis to verify the final channel slope for the diversion channel that provides a slightly aggradational system that is predicted to result in a braided low flow channel.

Verification: The results of the sediment transport analysis shall be in the basis of design report submitted with the FEMA application as required in Condition of Certification **SOIL&WATER-13**.

SOIL&WATER-16: The project owner, in accordance with Kern County Division Four Standards for Drainage, Chapter IV, shall provide engineering analyses or evidence showing that the diversion channel structural design elements will provide protection from hazards associated with the possible relocation of the Pine Tree Creek wash upstream of BSEP project boundaries.

Verification: The project owner shall provide engineering analyses or evidence to the CPM showing that the BSEP flood control facilities will provide protection from hazards associated with the relocation of Pine Tree Creek upstream from the site.

SOIL & WATER 17 deleted see BIO-18

SOIL&WATER-18: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the recycled waste water purveyor for the long-term supply (30 – 35 years) of disinfected tertiary recycled water to the BSEP. The project shall not operate without a long term agreement for recycled water delivery and connection to a recycled water pipeline for project use. The agreement shall specify a delivery rate to meet BSEP's maximum operation requirements and all terms and costs for the delivery and use of recycled water at the BSEP. The BSEP shall not connect to the new recycled water pipeline without the final agreement in place and submitted to the CPM. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.

Verification: No later than 60 days prior to the connection to the recycled water pipeline, the project owner shall submit two copies of the executed agreement for the supply and on-site use of disinfected tertiary recycled water at the BSEP. The agreement shall specify that the recycled waste water purveyor can deliver recycled water at a minimum rate of 900-gpm and will provide the BSEP a minimum of 1,424 AFY.

The project owner shall submit to the CPM a signed agreement between the applicant and the recycled waste water purveyor for the long-term supply of disinfected tertiary recycled water from the recycled wastewater purveyors treatment plant to the BSEP for industrial and landscape irrigation purposes.

The project owner shall submit to the CPM a copy of the Producer/User Water Recycling Requirements, the recycled wastewater criteria, the Engineering Report, and

the Cross Connection Inspection and Approval report prior to the connection to the disinfected tertiary recycled wastewater pipeline.

SOIL&WATER-19: Prior to the use of groundwater or recycled wastewater for operation of the BSEP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of water supplied to the BSEP. The metering devices shall be operational for the life of the project. An annual summary of daily water use by the BSEP, differentiating between potable and recycled wastewater, shall be submitted to the CPM in the annual compliance report.

Verification: At least 60 days prior to use of any water source for BSEP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the water pipelines serving the project. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

The project owner shall submit a water use summary report to the CPM in the annual compliance report for the life of the project. The annual summary report shall be based on volume of water used and shall distinguish recorded daily use of potable and recycled water. Included in the annual summary of water use, the project owner shall submit copies of meter records from the potable water and recycled water supplies documenting the volume of water supplied over the previous year. The report shall include calculated monthly range, monthly average, and annual use by the project in both gallons per day and acre-feet. After the first year and for subsequent years, this information shall also include the yearly range and yearly average potable and recycled water used by the project.

SOIL AND WATER - APPENDIX I

GROUNDWATER MITIGATION PLAN

Groundwater Monitoring

This groundwater monitoring program was provided in Attachment 5 of the Project Design Refinements (DB2009r) submitted to the CEC by the applicant in June 2009. As proposed by the applicant, the following describes the groundwater mitigation plan to be incorporated if the use of site groundwater is approved by CEC for power plant operation.

Proposed Groundwater Monitoring Program

To provide for land owner protection and participation in evaluation of project impacts, a Fremont Valley Groundwater Monitoring Committee will be formed. The committee will include a representative from the following:

- California City
- Community of Cantil
- Rancho Seco
- Honda
- Beacon Solar LLC

The monitoring committee's function will be to implement and oversee the groundwater monitoring program and to verify that there are no unacceptable impacts to groundwater levels or quality in water supply wells adjacent to the BSEP.

Gather Historic Water Level and Water Quality Data

- Secure access, if authorized by the land owner, for the purpose of monitoring of water levels and water quality for those water supply wells predicted by the numerical groundwater model to experience a change of 10 feet or more in its water level by comparison to the non-Project condition over the term of the project (30 years).
- Through the access agreement, obtain all historic water level and water quality data for each water supply well identified by the model. Additionally, obtain well completion information, historic well performance data, including pumping and non-pumping water levels and pump specifications for each well to be monitored.
- Update the application for certification (AFC) water level and geochemical and water level database with all new information.

- Prepare time series graphs (i.e., trend plots) for water level and total dissolved solids (TDS) data, as information is available for each well.
- Perform statistical trend analysis using Mann-Kendall Trend Test and Sen's Slope Estimator for water levels and the TDS data. The Mann-Kendall Trend Test and the Sen's Slope Estimator are proposed to statistically analyze the data because they are the accepted non-parametric trend analysis methods for data that are not normally distributed. Use trend analysis to determine the significance of an apparent trend and to estimate the magnitude of that trend. Further, use adjacent well data to evaluate local effects from pumping in water level trends.

Establish Pre-Project Baseline Water Quality and Water Level Database

- To the extent possible, prior to project construction collect groundwater levels from the off-site and on-site wells to evaluate groundwater levels in the area of wells that could be impacted by project pumping as indicated by the model. Additionally, collect groundwater samples to provide baseline TDS data for both on-site and off-site wells. Analyze TDS samples using Standard Methods 2540C by a California Certified Analytical Laboratory.
- Map TDS data and groundwater levels within the Koehn Sub-basin from the groundwater data collected prior to construction. Update trend plots and statistical analyses, as data is available.

Groundwater Monitoring During Construction

- During construction, collect water levels on a quarterly basis for a period of one year or on a quarterly basis through the construction period, and collect TDS data at the end of the construction period and prior to site operations.

Groundwater Monitoring During Operation

- On a quarterly basis for the first five years, collect water level measurements from the wells and collect TDS data to evaluate operational influence from the project. Additionally, monitor quarterly operational parameters (i.e., pumping rate) of the water supply wells.
- After a period of five years, on a well-by-well basis, evaluate the data and determine if the sampling frequency and TDS sampling should be revised or eliminated.
- Subsequently, evaluate the data set every five years and determine if the sampling frequency and TDS sampling should be revised or eliminated.

Proposed Mitigation Options

Water Level Offset Mitigation Options

Based on the results of the statistical trend analyses, determine if the project pumping has induced a drawdown in the water supply at a level of ten feet or more below the baseline trend. If water levels have been lowered below pre-site operational trends, then implement any of the following options, as appropriate and considering the cost effectiveness of each option.

- Electrical cost reimbursement – If the pumping water level falls below a depth of 5 feet from an average of the baseline measurements, the well owner will be compensated for the additional electrical costs commensurate with the additional lift required to pump. The water level in the well will be assessed relative to the pumping rate during pre-site operational period.
- Pump lowering – In the event that groundwater is lowered and existing pumps are day lighted, pumps can be lowered to maintain production in the well.
- Deepening of wells – If the groundwater is lowered enough that there is insufficient water in the well and pump lowering is not an option, then wells can be deepened.

Groundwater Storage Mitigation Options

Maximum expected groundwater usage during BSEP operation is estimated to be no more than 153 acre feet per year (AFY). Initially, the applicant proposed to use 1388 AFY of groundwater for power plant operation and provided options to offset that water consumption which included implementation of a partial ZLD and tamarisk removal program, which are described in the Project Design Refinements (DB 2009r). The project owners shall develop in coordination with Bureau of Land Management and other stakeholders, a voluntary tamarisk removal program designed to offset the collection of return flows from conversion of individual septic disposal systems in California City for the project recycled water supply. This program will initially identify areas of tamarisk infestation, provide annual funding for tamarisk eradication and will be implemented in the Fremont Valley Groundwater Basin.

SOIL AND WATER RESOURCES - APPENDIX J

GUIDANCE FOR BSEP RECLAMATION DISTRICT'S CHANNEL MAINTENANCE PROGRAM DEVELOPMENT

Channel Maintenance Program

Purpose and Objectives

This Appendix describes the purpose, objectives and applicability of Staff's requirements for the BSEP Reclamation District's Channel Maintenance Program (Program). Staff is requiring as part of Condition of Certification **SOIL&WATER-8** that the Channel Maintenance Program provide long-term guidance to the applicant to implement routine channel maintenance projects and comply with BSEP's related biological (**BIO-18**) and flood protection (**SOIL&WATER -5 and -6**) Conditions of Certification in a feasible and environmentally-sensitive manner. The main goals of the Program would be to maintain the diversion channel to meet its original design to provide flood protection, maintain native plant communities, provide wildlife habitat and a wildlife movement corridor, and maintain groundwater recharge. In this appendix, staff provides a summary of related programmatic documentation required for implementation of the Channel Maintenance Program.

The Channel Maintenance Program would be used by the applicant and the CPM to ensure that routine channel maintenance practices would be conducted in an efficient, consistent, and environmentally-sensitive manner. Staff's objectives for the Channel Maintenance Program are as follows:

1. Develop standardized practices and protocols for routine sediment removal, vegetation management, channel maintenance, and structural repair.
2. Ensure routine channel maintenance activities reflect the Energy Commission's Conditions of Certification for BSEP.
3. Avoid or minimize adverse environmental impacts and encourage preservation and restoration of the diversion channel and its revegetated areas.

Applicability and Use of the Channel Maintenance Program

The Channel Maintenance Program applies to routine channel maintenance activities, including three major types of activities: sediment removal, vegetation management, and bank protection and grade control maintenance/repairs. These activities would be

undertaken to ensure flood conveyance capacity is maintained in the channel. Additional minor maintenance activities would also be included in routine channel maintenance.

The channel maintenance work area addressed by this Channel Maintenance Program would include the BSEP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that BSEP or the District owns or holds an easement for access and maintenance. The Program would include Pine Tree Creek diversion channel maintenance as needed to protect the BSEP facilities. The District would not provide maintenance on private property, unless requested, or an easement was provided.

The Channel Maintenance Program would be a process and policy document prepared by BSEP, reviewed and approved by the CPM through consultation with CDFG and Kern County, and adopted by the District. Once adopted, the Channel Maintenance Program would be used by the applicant to guide the implementation of routine channel maintenance activities and projects. The Channel Maintenance Program would outline specific measures, protocols, policies, and inspection and reporting requirements to ensure that routine channel maintenance projects would be implemented in an efficient and environmentally-sensitive manner. This Channel Maintenance Program would be a living program that would change as improvements and modifications are made to reflect the best available knowledge, technology, and practices.

The Channel Maintenance Program is intended to establish an ongoing program for the life of the channel. Projections of future channel maintenance activities for the Channel Maintenance Program cannot represent the exact extent of work that would occur. Actual channel maintenance activities would vary from year to year. The Channel Maintenance Program would be reviewed annually by the CPM in the Annual Compliance Report as required in Condition of Certification **SOIL&WATER-8**. The overall program would be reviewed in ten years as part of the **BIO-18** revegetation milestone. Condition of Certification **BIO-18** specifies that within 10 years the applicant shall establish at least 15 percent of the 41.5-acre channel bottom, or 6.2 acres, with native desert shrub plant community, and that non-native weeds constitute less than 2 percent cover of the vegetated channel.

Channel Maintenance Activities

The following provides an overview and brief discussion of the major activities to be addressed by the Channel Maintenance Program. In addition, the Channel Maintenance Program applies to more minor, routine activities such as fence repair, trash removal, or other blockage clearing.

Sediment Removal

In most cases, sediment deposition is a natural process that occurs where the channel gradient flattens out or where the gradient is otherwise flat over long reaches. Some sediment is desirable in the engineered channel to support biological functions such as vegetation colonization. Unfortunately, sediment can build up to a point where it begins to compromise the design. Sediment removal is the act of mechanically removing sediment that has been deposited in the channel. Typically, sediment is removed when it: (1) reduces flood capacity, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows. Staff recommends that sediment removal projects be implemented in the dry season. The applicant would be required to implement BMPs to ensure that sediment removal projects have the least impact possible to native plant communities and wildlife habitat.

The method of sediment removal is dependent on the channel type (earth bottom, soil concrete bed, or stilling basin), equipment, soil characteristics, and maintenance access location. The average annual quantity of sediment to be removed would vary from year to year depending on rainfall conditions and sediment delivery from the watershed. During some or most years, no sediment would need to be removed. Aeolian processes may also cause a significant volume of sediment to accumulate from wind blown sand collecting in the low lying channel. Staff anticipates that the location of sediment removal within the channel would vary each year. The applicant and the District would develop Maintenance Guidelines (discussed below) to determine when and where sediment removal is required.

Vegetation Management

The applicant would manage vegetation in and adjacent to the diversion channel to maintain the biological functions and values described in **BIO-18**. Vegetation is not expected to adversely affect the ability of the channel to contain the design discharge owing to the relatively sparse nature of arid zone vegetation typically found in ephemeral channels. The applicant's vegetation management would include control of invasive or nonnative vegetation as described in **BIO-18**. Vegetation management can be accomplished through hand clearing or herbicide applications. A method or combination of methods could be chosen for each area depending on the maintenance needs. Staff recommends that the applicant only use herbicides according to the label directions and for uses approved by the United States Environmental Protection Agency (USEPA) and the California Department of Pesticide Regulation (DPR).

The applicant would also plant and maintain revegetation for the BSEP instream mitigation. In the first few years after initial planting, the applicant would provide weed control at mitigation areas to increase the number of native shrubs and establish a self-sustaining plant community which provides wildlife habitat as required in Condition of

Certification **BIO-18**. The applicant would manage vegetation for other purposes including the protection of soil cement linings from plant roots, levees (if applicable), and maintaining access roads.

The frequency of vegetation management activities and inspections shall be as described in **BIO-18**.

Bank Protection and Grade Control Repairs

Channel erosion is a natural process, which mostly happens during major storm events. Erosion can occur because of hydraulic forces and geotechnical instabilities. Bank protection and grade control structure repairs involve any action by the applicant to repair eroded banks, incised toes, scoured channel beds, as well as preventative erosion protection. The applicant would implement instream repairs when the problem (1) causes or could cause significant damage to BSEP, adjacent property, or the structural elements of the diversion channel, (2) is a public safety concern, (3) negatively affects groundwater recharge, or (4) negatively affects the native plant communities and wildlife habitat within the channel, or poses an entrapment hazard to desert tortoise and other wildlife.

Erosion of banks can result in increased sediment deposition, which can lead to decreased flood flow capacities and potential flood hazards. A major failure to the soil cement bank cover or grade control structure would cause severe erosion, may cause property damage, and would create a safety hazard and threat to wildlife. Repair of soil cement bank protection and grade control structures shall occur when these structures show substantial erosion and/or fail and would be replaced with in-kind, in-place materials within the same footprint. Obstructions at grade control structures would be removed to maintain functions of such structures and access for desert tortoise and other wildlife.

Banks and grade control structures would be inspected after all major storms for damage and maintenance needs. The applicant would make an inspection of the channel upstream and downstream of an erosion site to determine if there is an identifiable cause of the erosion. Design of a particular facilities repair may require evaluation of other site-specific characteristics such as bank slope, shear stress, soil type, flow velocity and depth, Froude number, or the active channel's geomorphic characteristics.

Routine Channel Maintenance

Routine channel maintenance activities included in this Channel Maintenance Program would be: trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore

the original contour of access roads and levees (if applicable); and removal of flow obstructions at BSEP storm drain (flap gate) outfalls.

Routine maintenance occurs on a year-round basis. Typically, routine maintenance that requires the operation of heavy equipment in the channel would be limited to the dry conditions.

Channel Maintenance Program – Exclusions

Routine channel maintenance would not include emergency repair. A situation is considered an "emergency" if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resource Code Section 21060.3).

Large construction projects or Capital Improvement Projects (CIP) would not be considered routine channel maintenance and would not be addressed through the Channel Maintenance Program. Staff recommends that the applicant coordinate with Kern County and the CPM to develop a long-term plan that deals with CIP for the diversion channel.

Related Programmatic Documentation

Because this Channel Maintenance Program would be designed to guide the implementation of routine channel maintenance projects and activities over the long-term, it shall address channel maintenance at a general or "programmatic" level. As such, staff's Condition of Certification **SOIL&WATER-8** provides guidelines and implementation measures that characterize how channel maintenance would be conducted by the District.

The applicant would be required to comply with the Requirements of Waste Discharge provided in **Soil and Water Appendices E, F, G & H** as discussed in Condition of Certification **Soil&Water-4**. The applicant would also be required to meet CDFG requirements for channel maintenance activities and provide CDFG with a copy of the Channel Maintenance Program for review and comment. Because the diversion channel would be mapped as a SFHA, the applicant would be required to comply with NFIP regulations. The CPM would review all agency permits for routine channel maintenance activities and approve the Channel Maintenance Program.

Channel Maintenance Process Overview

This section describes Staff's recommendation for three distinct phases of the Channel Maintenance Program: program development and documentation, implementation of annual routine channel maintenance activities, and annual compliance reporting.

Program Development and Documentation

This Channel Maintenance Program would be developed to guide the long-term implementation of the District's annual routine channel maintenance work. The Channel Maintenance Program would enable the applicant to participate in a watershed-wide approach to environmental protection. Through these programmatic documents, the applicant would be committed to implementing individual maintenance projects in an environmentally-sensitive manner.

Maintenance Guidelines

Staff's Maintenance Guidelines are based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition. The maintenance standard is defined as the design facility condition, where the engineered channel has full design capacity and freeboard. The acceptable maintenance condition is the condition to which a channel can be allowed to deteriorate before capacity is determined to be compromised and maintenance work becomes essential. The focus of BSEP's hydraulic and sediment transport analyses were related to the study of these two concepts. These analyses were prepared to investigate the *annual* accumulation of sediment and forecast the threshold of an acceptable maintenance condition. Further study is needed to understand annual sediment contribution, accumulation and capacity constraints.

The Maintenance Guidelines may also apply to other activities such as vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance. Vegetation in the desert channel environment does affect the channel's roughness, but increases in channel roughness would be slight because of the sparse vegetation and it is not expected to have an impact on the channel's flood capacity. By conducting these routine maintenance activities, the applicant would ensure that facilities continue to provide the level of flood protection for which they were constructed. These efforts protect channel function and help to comply with NFIP regulations and Kern County's Floodplain Management Ordinance.

Implementation

Maintenance work would be proposed either as part of a Channel Maintenance Work Plan or as other work identified later in the year through inspection. Staff recommends specific Maintenance Guidelines be developed to ensure that the maintenance meets

pre-established conditions of certification and engineering requirements. Staff recommends that field reconnaissance, inspection or survey be implemented to monitor the channel's maintenance condition and compare to specific Maintenance Guidelines. Maintenance Guidelines for BSEP's vegetation management activities are established in Condition of Certification **BIO-18**.

BSEP's Maintenance Guidelines for sediment removal would provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection. Sediment should be allowed to store in the channel as minor aggradation which is part of the sediment transport and geomorphic function of the channel. Staff believe that sediment storage in the basin of the grade control structures provide an excellent source of sediment for long-term transport through the engineered channel. Staff recommends that the channel sediment be allowed to accumulate, on average, up to the sill elevation plus the depth of the active channel. Staff estimates that the depth of the active or bank full channel is roughly 1.5 to 2.5 feet, but further study is recommended. BSEP's engineer should verify that this sediment storage threshold, several feet above the sill elevation, would not affect the grade control structures ability to perform under the design discharge. Staff also recommends that BSEP verify that the channel would maintain capacity for the design discharge as part of compliance with Conditions of Certification **SOIL&WATER- 6(E), 7, and -15**.

Reporting

To assess the overall progress of the mitigation program and determine the accuracy of the impact projections, annual reports would be made to the CPM for review as part of the BSEP's Annual Compliance Report. The Channel Maintenance Program Annual Report would specify which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed). Staff requires that the applicant provide a report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year. The information and assessments would be used to update BMPs, Channel Maintenance Program processes, and the Maintenance Guidelines and to create a greater understanding of how to accomplish environmentally-sensitive maintenance work. The report should also include a section describing any planned "major" maintenance activities and the extent of work to be accomplished.

In addition to reporting on the maintenance activity completed for the year, the applicant would also provide reporting on the implementation of the mitigation program. For the first 10 years of the program, the applicant would provide photographs of the diversion channel and meet the verification requirements of Condition of Certification **BIO-18**.

Resource Protection Policies

Staff recommends the Channel Maintenance Program establish policies to ensure that resources would be protected to the furthest extent feasible during routine channel maintenance activities and are consistent with state and federal laws protecting special status species. The Channel Maintenance Program policies would be developed to guide decision-making for channel maintenance activities. The applicant would develop these policies through the routine channel maintenance planning process. BMPs would be developed to implement these policies. All routine channel maintenance activities would adhere to the policies contained in the program. Staff recommends that the applicant implement the following policies:

Policy 1: *The applicant will conduct all routine channel maintenance activities according to the process and protocols established in the Channel Maintenance Program.*

Policy 2: *Decisions regarding the necessity of routine sediment removal (to restore design discharge capacities) and vegetation management activities will be made by the applicant using the thresholds established in the Maintenance Guidelines. This information will be used to formulate in part an annual routine maintenance work plan.*

Policy 3: *The District will continue to develop, implement, and update BMPs for implementation of channel maintenance projects to ensure that maintenance activities are conducted in the most effective and environmentally-sensitive way possible and are technically feasible and economically reasonable.*

Policy 4: *The applicant will use the Channel Maintenance Program to manage its routine channel maintenance activities in a programmatic way.*

Policy 5: *The applicant will implement measures to avoid and minimize impacts to native species, especially special-status and riparian-dependent species. All management actions taken shall be consistent with state and federal laws protecting special status species (California Endangered Species Act of 1984, Fish and Game Code, sections 2050 through 2098; Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)*

Policy 6: *Control and removal of native vegetation will be minimized to the extent practicable. Where appropriate, measures will be taken to leave the work site in a vegetated condition after routine channel maintenance activities are completed.*

Policy 7: *The applicant's use of herbicides will be consistent with environmental goals, including protection, preservation, and restoration. Herbicides will be used such that negative effects to the environment are avoided or minimized.*

Policy 8: *The applicant will implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means when removing sediments from the channel.*

Policy 9: *The temporary stockpiling, transportation, and disposal of removed sediments from channel maintenance projects shall be implemented, avoiding or minimizing impacts to the surrounding natural environment.*

Policy 10: *Channel maintenance projects shall be implemented, avoiding or minimizing the potential for short-term noise nuisances and short-term air quality impacts to the surrounding community.*

Policy 11: *Measures shall be implemented at the work site to ensure that the potential for significant impacts to previously undiscovered cultural resources are reduced to less-than-significant levels.*



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
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1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV**

APPLICATION FOR CERTIFICATION
For the *BEACON SOLAR ENERGY
PROJECT*

Docket No. 08-AFC-2

PROOF OF SERVICE

(Revised 1/26/10)

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DECLARATION OF SERVICE

I, Janet Preis, declare that on February 1, 2010, I served and filed copies of the attached, Cover Letter, Proposed Conditions of Certification, Appendix I, and Appendix J. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [\[http://www.energy.ca.gov/sitingcases/beacon/index.html\]](http://www.energy.ca.gov/sitingcases/beacon/index.html).

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

sent electronically to all email addresses on the Proof of Service list;

by personal delivery or by depositing in the United States mail at Sacramento with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 08-AFC-2
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

/s/ Janet Preis
JANET PREIS